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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,932	07/07/2003	Woo Chan Kim	2080-3-177	9201

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EXAMINER

DSOUZA, JOSEPH FRANCIS A

ART UNIT	PAPER NUMBER
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2611

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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/614,932	KIM, WOO CHAN	
	<b>Examiner</b>	<b>Art Unit</b>	
	Adolf DSouza	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some    \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

***Claim Objections***

2. Claim 1 is objected to because of the following informalities: The preamble should be changed to "A VSB reception system for ... comprising:" Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 - 7, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Sweitzer et al. (US 20020072879).

Regarding claim 1, Applicant's admitted prior art discloses a VSB reception system (Fig.

1) comprising:

a demodulating part for receiving, converting, and demodulating a signal (Fig. 1);

a frequency domain equalizing part for equalizing the demodulated signal for removing a distorted component from the demodulated signal (Fig. 1);

Applicant's admitted prior art does not disclose a noise removal circuit.

In the same field of endeavor Sweitzer discloses a noise removing part (Fig. 4) for (a) receiving the equalized signal (Fig. 4, output of element 410; page 6, paragraph 70), (b) calculating a reference error signal that is a difference between the equalized signal and the signal having the noise removed there from (Fig. 4, output of element 470; page 7, paragraph 73, 1<sup>st</sup> 4 lines), (c) calculating an error signal that is a difference between the reference error signal and the extracted noise signal (Fig. 4, output of element 460; wherein the error signal is the output of element 460. Sweitzer does not explicitly state that the error signal is the difference between the reference error signal and the extracted noise signal. However, one of ordinary skill in the art can easily show through simple mathematical operations that the output of element 460 is equal to the difference between the output of element 470 and the output of the noise predictor), (d) renewing parameters with reference to the reference error signal and the error signal (page 6, paragraph 72; wherein renewing the parameters is interpreted as being done by the adaptive filter of the noise predictor), and (e) calculating a difference between the equalized signal and the extracted noise signal, to provide a signal having the noise removed there from (Fig. 4, output of element 430; page 7, paragraph 73, lines 8 - 12).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Sweitzer, in the Applicant's

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prior art system because this would reduce the noise, thereby improving the SNR, as is well known in the art.

Regarding claim 2, Applicant's admitted prior art discloses the demodulating part carries out tuning to a desired channel from received RF (Radio Frequency) signals, converting a RF signal on the tuned channel into an IF (Intermediate Frequency) signal, and demodulating the IF signal in reverse of a VSB modulating method (Fig. 1).

Regarding claim 3, Applicant's admitted prior art discloses the frequency domain equalizing part carries out converting a received time domain signal into the frequency domain signal, equalizing the frequency domain signal, and converting the equalized frequency domain signal into a time domain signal (Fig. 1).

Claim 4 is similarly analyzed as claim 3.

It is noted that the applicant has stated that the operator acts as the subtractor (specification, page8, paragraph 30) and therefore the examiner has interpreted the operator as being a subtractor.

Regarding claim 5, Applicant's admitted prior art does not disclose operators and a filtering unit.

In the same field of endeavor Sweitzer discloses the noise removing part includes:

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a first operator for calculating a difference between signals from/to the noise removing part, to provide a reference error signal (Fig. 4, element 470; page 7, paragraph 73, 1<sup>st</sup> 4 lines)

a second operator for calculating a difference between the reference error signal and the extracted noise signal, to provide an error signal (Fig. 4, element 460; page 7, paragraph 73);

a filtering part for renewing parameters with reference to the reference error signal from the first operator and the error signal from the second operator, to extract a noise signal (Fig. 4, element 450; page 6, paragraph 72);

and a third operator for calculating a difference between a signal from the noise removing part and the noise signal extracted at the filtering part to provide a signal having the noise removed there from (Fig. 4, element 430; page 6, paragraph 72, last 6 lines).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Sweitzer, in the Applicant's prior art system because this would reduce the noise, thereby improving the SNR, as is well known in the art.

It is noted that the applicant has stated that the "deciding part" acts as the slicer (specification, page 8, paragraph 29) and therefore the examiner has interpreted the "deciding part" as being a slicer.

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Regarding claim 6, Applicant's prior art does not disclose a "deciding part".

In the same field of endeavor Sweitzer discloses a deciding part between the first operator and the third operator for making decision with reference to a signal from the third operator (Fig. 4, element 420; page 6, paragraph 71; wherein the deciding part is interpreted as the quantizer or slicer and the third operator is the subtractor 430).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Sweitzer, in the Applicant's prior art system because this would allow the noisy symbol to be sliced, thereby providing the correct transmitted symbol, as is well known in the art.

Regarding claim 7, Applicant's prior art discloses a VSB receiver (Fig. 1).

The limitation regarding the deciding part being a slicer is as analyzed in claim 6 above.

Regarding claim 11, Applicant's prior art does not disclose that the operators are subtractors or adders.

In the same field of endeavor Sweitzer discloses the first, second, and third operators are subtractors or adders (Fig. 4, elements 470, 460, 430; wherein the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> operators are the subtractors 470, 460 and 430 respectively).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Sweitzer, in the Applicant's

prior art system because this would allow the difference signal or error signal to be computed.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Sweitzer et al. (US 20020072879) and further in view of Limberg (US 20010033341).

Regarding claim 8, Applicant's admitted prior art does not disclose delay units.

In the same field of endeavor Limberg discloses a first delay for delaying, and forwarding a signal received at the noise removing part to the first operator, a second delay for delaying, and forwarding a signal from the third operator to the first delay, and a third delay for delaying, and forwarding the noise signal extracted at the filtering part to the second operator (page 6, paragraph 47, last 12 lines; Fig. 8, element 22; wherein the first, second and third delays are interpreted as the compensatory delay 22 that compensates for delays through various elements).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Limberg, in the Applicant's prior art system because this would allow the delay elements to compensate for delays through various elements, as disclosed by Limberg.



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6. Claims 9 - 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Sweitzer et al. (US 20020072879) and further in view of Widrow et al. (Adaptive Signal Processing; 1985; Prentice-Hall; pages 99 - 101.

Regarding claim 9, Applicant's admitted prior art does not disclose the LMS algorithm.

In the same field of endeavor Widrow discloses the filtering part is an LMS (Least Mean Square) filter for renewing the parameters by LMS method (page 100, Equation 6.3 and 2 paragraphs from there; page 101, Fig. 6.1).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Widrow, in the Applicant's prior art system because this would allow the coefficients of the adaptive filter to be updated, as is well known in the art.

Claim 10 is similarly analyzed as claim 9, with the LMS equation as shown on page 100, Equation 6.3.

#### ***Other Prior Art Cited***

The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to VSB systems, frequency domain equalization and noise prediction in equalizers:

Ghosh (US 6,219,379) discloses a VSB receiver with complex equalization for improved multipath performance.

Patel et al. (US 6,313,885) discloses a DTV receiver with baseband equalization filters for QAM signal and for VSB signal which employ common elements.

Perreault (US 4,027,257) discloses a Frequency domain automatic equalizer having logic circuitry.

Perreault (US 4,100,604) discloses a Frequency domain automatic equalizer utilizing the discrete Fourier transform.

Minuhin (US 5,650,954) discloses a frequency and time domain adaptive filtration in a sampled communication channel.

Chevillat et al. (US 5,784,415) discloses a Adaptive noise-predictive partial-response equalization for channels with spectral nulls.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



AD

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Examiner  
Art Unit 2611



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